Status of the Claims

1 -2. (Cancelled)

3. (Previously Presented) A vertical cavity surface-emitting laser comprising:

a device structure, having a height z and an aperture, including

an active layer having an upper and lower surface, and

upper and lower distributed Bragg reflectors on the upper and lower surfaces of the active layer and adjacent thereto;

a layer having a non-planar surface within the device structure, positioned at height x, where $0 \leq x < z$, between heights x and z;

contacts for applying a voltage across the active region;

a light emission property that varies within the aperture, wherein the light emission property enables higher order spatial modes; and

wherein the refractive index varies in the plane perpendicular to light output and the light output is in spatially fixed modes.

4. (Original) A vertical cavity surface-emitting laser, as defined in claim 3, wherein the refractive index has a lengthscale on the order of the lasing wavelength.

5. (Original) A vertical cavity surface-emitting laser, as defined in claim 3, further comprising a substrate having a first side adjacent to the lower distributed Bragg reflector.

6. (Original) A vertical cavity surface-emitting laser, as defined in claim 5, further including a texturing layer interposing the substrate and the device structure, wherein the non-planar layer is the texturing layer.

7. (Original) A vertical cavity surface-emitting laser, as defined in claim 6, wherein the texturing layer is patterned.

8. (Original) A vertical cavity surface-emitting laser, as defined in claim 5, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.

9. (Original) A vertical cavity surface-emitting laser, as defined in claim 5, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.

10. (Original) A vertical cavity surface-emitting laser, as defined in claim 5, wherein non-planar layer is a first surface of the substrate adjacent the lower Bragg reflector.

11. (Original) A vertical cavity surface-emitting laser, as defined in claim 10, wherein the first surface is patterned.

12. (Previously Presented) A vertical cavity surface-emitting laser, as defined in claim 5, wherein the non-planar layer introduces a phase mismatch in the device structure.

13. (Original) A vertical cavity surface-emitting laser, as defined in claim 12, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.

14. (Original) A vertical cavity surface-emitting laser, as defined in claim 13, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.

15. (Previously Presented) A vertical cavity surface-emitting laser, as defined in claim 5, further comprising a planarizing plane within the device structure, positioned at height y, where $x<y<z$.

16. (Original) A vertical cavity surface-emitting laser, as defined in claim 15, between heights x and y, the refractive index varies in the plane perpendicular to the light output.

17. (Original) A vertical cavity surface-emitting laser, as defined in claim 15, wherein the refractive index has a lengthscale on the order of the lasing wavelength.

18. (Original) A vertical cavity surface-emitting laser, as defined in claim 15, further comprising a substrate having a first surface adjacent to the lower distributed Bragg reflector.

19. (Original) A vertical cavity surface-emitting laser, as defined in claim 18, further including a texturing layer interposing the substrate and the device structure, wherein the non-planar layer is the texturing layer.

20. (Original) A vertical cavity surface-emitting laser, as defined in claim 19, wherein the texturing layer is patterned.

21. (Original) A vertical cavity surface-emitting laser, as defined in claim 19, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.

22. (Original) A vertical cavity surface-emitting laser, as defined in claim 18, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.

23. (Original) A vertical cavity surface-emitting laser, as defined in claim 18, wherein non-planar layer is a first surface of the substrate adjacent the lower Bragg reflector.

24. (Original) A vertical cavity surface-emitting laser, as defined in claim 23, wherein the first surface is patterned.

25. (Original) A vertical cavity surface-emitting laser, as defined in claim 15, wherein the non-planar layer introduces a phase mismatch in the device structure.

26. (Original) A vertical cavity surface-emitting laser, as defined in claim 25, wherein the non-planar layer is a layer within at least one of the upper and lower distributed Bragg reflectors.

27. (Original) A vertical cavity surface-emitting laser, as defined in claim 25, wherein the layer within at least one of the upper and lower distributed Bragg reflectors is patterned.

28. (Previously Presented) A method for manufacturing a vertical cavity surface emitting laser comprising the steps of:

preparing a substrate such that there is a layer having a textured surface having a light emission property that varies within the aperture, wherein the light emission property enables higher order spatial modes;

depositing a lower distributed Bragg reflector;

depositing an active layer;

depositing an upper distributed Bragg reflector; and

fabricating electrical contacts for applying a voltage across the active layer.

29. (Original) A method for manufacturing a vertical cavity surface emitting laser, as defined in claim 28, further comprising the step of removing the substrate after the step of fabricating electrical contacts.

30. (Previously Presented) A method for manufacturing a vertical cavity surface emitting laser comprising the steps of:

depositing a lower distributed Bragg reflector having a layer having a textured surface having a light emission property that varies within the aperturere, wherein the light emission property enables higher order spatial modes; and;

depositing an active layer;

depositing an upper distributed Bragg reflector; and

fabricating electrical contacts for applying a voltage across the active layer.

31. (Previously Presented) A method for manufacturing a vertical cavity surface emitting layer comprising the steps of:

depositing a lower distributed Bragg reflector;

depositing an active layer having a layer having a textured surface having a light emission property that varies within the aperturere, wherein the light emission property enables higher order spatial modes; and;

depositing an upper distributed Bragg reflector; and

fabricating electrical contacts for applying a voltage across the active layer.

32. (Previously Presented) A method for manufacturing a vertical cavity surface emitting layer comprising the steps of:

depositing a lower distributed Bragg reflector;

depositing an active layer;

depositing an upper distributed Bragg reflector having a layer having a textured surface having a light emission property that varies within the aperturere, wherein the light emission property enables higher order spatial modes; and; and

fabricating electrical contacts for applying a voltage across the active layer.